IBM DB2 12 for z/OS expands the value offered to your business by IBM's industry-leading mainframe data server

At a glance

IBM^(R) DB2^(R) 12 for z/OS^(R) continues to extend the value delivered to your business by IBM's industry-leading data server, while empowering your future, in the following ways:

- Delivers business insights faster while helping to reduce costs
- Enables easy access, scale, and application development for the mobile enterprise
- Improves in-memory database performance, helping to reduce costs
- Continues to be the industry gold standard for availability, reliability, and security for business-critical information

Overview

IBM will make DB2 12 for z/OS generally available on October 21, 2016.

DB2 12 takes DB2 to a new level, both extending the core capabilities and empowering the future. DB2 12 extends the core with new enhancements to scalability, reliability, efficiency, security, and availability. DB2 12 also empowers the next wave of analytics and mobile applications.

DB2 12 delivers selected features that bring valuable benefits to your business.

Extending IBM analytics leadership

- Improvements in support of analytics workloads, including optimized performance and improved zIIP offload in support of in-transaction analytics. All parallel child task processing is now zIIP eligible.
- Deliver insights faster with up to 50% elapsed query time improvement.
- Improved DB2 Analytics Accelerator performance and expanded query support.

Mobile and internet of things (IoT) support for your enterprise

- Support for SQL as a service (SQLaaS) through RESTful connectivity to your DB2 for z/OS data.
- Support for modernized, multiplatform, automated application deployments using technology such as IBM Urban Code Deploy and z/OSMF, which provide agility and speed to market.

- Enhanced support for cloud and mobile workloads with dramatic scalability improvements for tables, increasing the maximum table size from 16 TB to 4 PB, enabling support for up to 280 trillion rows in a single DB2 table.
- Enhanced support for the next generation of mobile applications through the optimization of syntax that is common to mobile workloads such as OFFSET, SQL PL in triggers, and many other improvements.
- Enhanced load capability that enables cloud and mobile workloads to upload data directly into a table on DB2 z/OS using a new high-performance, low-latency zLOAD API.

IBM Cloud Provisioning and Management

- DB2 12 exploits the IBM Cloud Provisioning and Management functionality provided in IBM z™/OS V2.2.These z/OS cloud capabilities provide added benefits to simplify and improve configuration and deployment of a number of components of the z/OS software landscape, thereby enabling you to improve the agility, efficiency, and economics of your IT infrastructure. With these added cloud capabilities, DB2 12 supports the following capabilities:
  - Rapidly provision environments for workload deployment and release the resources to a shared pool when complete.
  - Enable direct access of z/OS computing resources by end users through your existing self-service portal or by using IBM's sample portal.
  - Create service catalogs with customizable services that exploit the multitenancy and rapid elasticity of z/OS.
  - Invoke these new functions through a web browser-based user interface or through programmable REST interfaces.
  - Provision DB2 12 subsystems and other z/OS software subsystems such as IBM CICS(R) Transaction Server for z/OS, IBM IMS™ for z/OS, IBM MQ for z/OS, and IBM WebSphere(R) Application Server for z/OS.
  - Provision known DB2 database schemas by leveraging the IBM DB2 Change Management Solution Pack for z/OS, V1.1 (5655-CH1).
- For additional z/OS V2.2 details, see Software Announcement 216-392, dated October 4, 2016.

Extending the unique value of z Systems™

- Expanded in-memory processing for greater performance improvement and emerging use case support, such as synergy with the latest IBM z Systems™ processors, which offer significantly expanded memory capacity.
- Up to 30% CPU improvement for query workloads and even higher CPU improvements in select query workloads exploiting DB2 12 query optimization. Up to 10% online transaction processing (OLTP) CPU savings with larger memory and activation of memory exploitation features.
- High-volume insert performance equaling two times throughput increase for concurrent sequential insert without clustering.

Simplified management and application deployment

- More flexible data partitioning enables partitions to grow past previous size limits and new partitions to be dynamically inserted.
- Extends unprecedented query performance reliability and stability to dynamic SQL with dynamic plan stability.
- Online schema enhancements that improve manageability and availability, in addition to support for improved partition management, reducing the need for planned outages.
- Greater than 4GB active log data set, which simplifies log management and improves recovery time.
- Exploitation of recent z Systems enhancements to compress LOB data, which can dramatically reduce the amount of storage and memory for storing and manipulating large objects.
- Extended leadership with security enhancements, including support for TRANSFER OWNER and more granular ADMIN authority.

- Enhanced system administrator capabilities to migrate and install DB2 systems while preventing unwanted access to user data.
- Optimized management through improved utility performance, usability, and availability of your mission-critical assets through enhanced REORG partition processing, new FlashCopy[(R)] and system-level backup capability, and further zIIP processor exploitation.
- Single-phase catalog migration, which reduces the change windows involved in migrating completely to the new release.

Benefiting from enhancements in a faster, more consumable way

- DB2 12 continually delivers new DB2 capabilities and enhancements in a single service stream as the code becomes ready. The result is that clients can benefit from new capabilities and enhancements without waiting for a new release. Clients can activate the new capabilities when a *function level* is delivered.
- Function levels enable you to control the timing of the activation and adoption of new features, with the option to continue to apply corrective and preventative service without adopting new features and functions.

SAP solutions

- Many enhancements are available for clients using SAP applications on DB2 for z/OS; for instance, query engine improvements and a new UDF cache for SAP Core Data Services (CDS). Also, the Zero Downtime Option (ZDO) of the SAP's Software Update Manager benefits from online DDL improvements. Scalability is enhanced with tables that can grow up to 4 PB in size. For the SAP fast loader, DB2 12 introduces the new ultra-fast remote load capability from DB2 Connect[TM]-based clients.
- SAP has announced their successful validation and support of DB2 12 to run SAP applications immediately when DB2 12 is generally available. Details can be found in SAP Note 2302997.

Key prerequisites

- IBM z/OS V2.1 Base Services, (5650-ZOS), or later
- IBM zEnterprise[(R)] 196 (z196) or IBM zEnterprise 114 (z114), or higher, processors running z/OS V2.1, or later

Planned availability date

October 21, 2016

Description

The demands of the mobile economy and the greater need for faster business insights, combined with the explosive growth of data, present unique opportunities and challenges for companies wanting to take advantage of their mission-critical resources. Built on the proven, trusted availability, security, and scalability of DB2 11 for z/OS and the z Systems platform, the gold standard in the industry, DB2 12 gives you the capabilities needed to securely meet the business demands of mobile workloads and increased mission-critical data. It delivers world-class analytics and OLTP performance in real-time.

DB2 for z/OS delivers innovations in these key areas:

Scalable, low-cost, enterprise OLTP and analytics

DB2 12 continues to improve upon the value offered with DB2 11 with further CPU savings and performance improvements utilizing more memory optimization. Compared to DB2 11, DB2 12 clients can achieve up to 10% CPU savings for various traditional OLTP, and heavy concurrent INSERT query workloads may see higher

benefits, with up to 30% CPU savings and even more benefit for select query workload utilizing UNION ALL, large sort, and selective user-defined functions (UDFs).

DB2 12 provides more cost reduction with more zIIP eligibility of DB2 REORG and LOAD utility.

DB2 12 provides deep integration with the IBM z13™, offering the following benefits:

- More efficient use of compression
- Support for compression of LOB data (also available with the IBM zEnterprise EC12)
- Faster XML parsing through the use of SIMD technology

Enhancements to compression aids DB2 utility processing by reducing elapsed time and CPU consumption with the potential to improve data and application availability. Hardware exploitation to support compression of LOB data can significantly reduce storage requirements and improve overall efficiency of LOB processing.

DB2 12 includes the new SQL TRANSFER OWNERSHIP statement, enabling better security and control of objects that contain sensitive data. In addition, DB2 12 enables system administrators to migrate and install DB2 systems while preventing access to user data.

The real-world proven, system-wide resiliency, availability, scalability, and security capabilities of DB2 and z Systems continue to be the industry standard, keeping your business running when other solutions may not. This is especially important as enterprises support dynamic mobile workloads and the explosion of data in their enterprises. DB2 12 continues to excel and extend the unique value of z Systems, while empowering the next wave of applications.

Easy access, easy scale, and easy application development for the mobile enterprise:

In-memory performance improvements

As enterprises manage the emergence of the next generation of mobile applications and the proliferation of the IoT, database management system (DBMS) performance can become a critical success factor. To that end, DB2 12 contains many features that exploit in-memory techniques to deliver world-class performance, including:

- In-memory fast index traverse
- Contiguous and larger buffer pools
- Use of in-memory pipes for improved insert performance
- Increased sort and hash in-memory to improve sort and join performance
- Caching the result of UDFs
- In-memory optimization in Declare Global Temporary Table (DGTT) to improve declare performance
- In memory optimization in Resource Limit Facility to improve RLF checking

DB2 12 offers features to facilitate the successful deployment of new analytics and mobile workloads. Workloads connecting through the cloud or from a mobile device may not have the same performance considerations as do enterprise workloads. To that end, DB2 12 has many features to help ensure that new application deployments are successful. Improvements for sort-intensive workloads, workloads that use outer joins, UNION ALL, and CASE expressions can experience improved performance and increased CPU parallelism offload to zIIP.

Easy access to your enterprise systems of record

DB2 12 is used to connect RESTful web, mobile, and cloud applications to DB2 for z/OS, providing an environment for service, management, discovery, and invocation. This feature works with IBM z/OS Connect Enterprise Edition (z/OS Connect EE,

5655-CEE) and other RESTful providers to provide a RESTful solution for REST API definition and deployment.

The IBM Data Studio product, which can be used as the front-end tooling to create, deploy, or remove DB2 for z/OS services, is supported. Alternatively, new RESTful management services and BIND support are provided to manage services created in DB2 for z/OS. This capability was first made available in the DB2 Adapter for z/OS Connect feature of theDB2 Accessories Suite for z/OS, V3.3 (5697-Q04) product, working with both DB2 10 for z/OS and DB2 11 for z/OS.

Overview of DB2 features

DB2 12 for z/OS consists of the base DB2 product with a set of optional separately orderable features. Select features QMF™ Enterprise Edition V12 and QMF Classic Edition V12 are also made available as part of DB2 11 for z/OS (5615-DB2). Some of these features are available at no additional charge and others are chargeable:

Chargeable features for QMF V12 (features of DB2 12 for z/OS and DB2 11 for z/OS)

QMF Enterprise Edition provides a complete business analytics solution for enterprise-wide business information across end-user and database platforms. QMF Enterprise Edition consists of the following capabilities:

- QMF for TSO and CICS
- QMF Enhanced Editor (new)
- QMF Analytics for TSO
- QMF High Performance Option (HPO)
- QMF for Workstation
- QMF for WebSphere
- QMF Data Service, including QMF Data Service Studio (new)
- QMF Vision (new)

New enhancements for each capability are as follows:

QMF for TSO and CICS has significant improvements for the QMF for TSO/CICS client.

- The QMF process of saving database tables, traditionally accomplished through the QMF SAVE DATA command, has been enhanced. QMF SAVE DATA intermediate results can now be saved to IBM DB2 Analytics Accelerator for z/OS'Accelerator-only tables'. The ability to save intermediate results in Accelerator-only tables is also available for the command IMPORT TABLE and the new QMF RUN QUERY command with the TABLE keyword. This exploitation of the Accelerator may result in benefits such as improved performance, reduced batch window allocation for QMF applications, and reduced storage requirements.
- By using the new TABLE keyword on the RUN QUERY command, you can now save data, using the SAVE DATA command, without needing to return and complete a data object. The RUN QUERY command with the TABLE keyword operates completely within the database to both retrieve data and insert rows without returning a report to the user.
- Usability of the TSO client is improved by the enhanced editor feature (see the **QMF Enhanced Editor** section for more detail.).
- Both the TSO and CICS clients now have the ability to organize queries, procedures, forms, and analytics into groups called *folders,* aiding in productivity and usability. QMF commands such as LIST, SAVE, ERASE, and RENAME have been updated to work with folders.
- QMF TSO and CICS clients now have additional report preview options. After proper setting of the DSQDC_DISPLAY_RPT global variable, users will be able to enter a report mini-session, where queries can be run to view potential output without actually committing the results. The report mini-session can be useful for

running and testing SELECT with change type queries. Upon exiting the report mini-session, the user will be prompted to COMMIT or ROLLBACK the query.

- With Version 12, QMF's TSO and CICS clients deliver significant performance and storage improvements.
  - Using the new QMF program parameter option DSQSMTHD, users can make use of a second data base thread. The second thread is to be used for RUN QUERY and DISPLAY TABLE command processing. Usage of a second data base thread can assist with performance issues on SAVE operations with an incomplete report outstanding. Additionally, usage of the second thread can reduce storage requirements for SAVE DATA commands on large report objects because rows will not need to reside in storage but can be retrieved from the data base and inserted into the new table as needed.
  - Using the DSQEC_BUFFER_SIZE global variable, the QMF internal storage area used to fetch data base row data can be increased. By changing the default from 4 kilobytes to a value up to 256 kilobytes, QMF can increase the amount of data fetched in a single call to the data base. Less calls to the data base reduces the amount of time it takes to complete the report, which can result in significant performance improvements.
- QMF's TSO and CICS clients now integrates with QMF Data Service, enabling users of this interface to access a broader range of data sources. The support enables access to z/OS and non-z/OS data sources, including relational and nonrelational data sources (see the **QMF Data Service** section for a description of accessible data types). This capability is available only through QMF Enterprise Edition.

QMF Enhanced Editor (new) provides usability improvements to the TSO client by bringing customizable highlighting and formatting for SQL syntax, reserved words, functions, and data types, and parenthesis checking. The new query assist feature provides table name suggestions, column name and data type information, and suggested column value information, plus a preview pane.

QMF Analytics for TSO has been enhanced as follows:

- Three new statistics models have been added: Wilcoxon Signed-Rank Test, Mann-Whitney U Test, and the F-Test model.

- A user-defined mapping capability has been added. OpenGIS WKT map definitions are available in either DB2 tables or exported data sets, which can be read to format user-specific maps.

- Maps for Africa, North America, South America, and Germany have been added to the existing library of predefined maps.

- The ability to choose columns for use in analytical analyzes has been improved with enhanced data type targeting and information.

- Mouse (graphics cursor) support is added for quicker interaction with the QMF Analytics for TSO functionality.

- Saving analytics has been updated to display a list of existing analytics objects.

QMF for Workstation and **QMF for WebSphere** add additional support for DB2 Analytics Accelerator and enable QMF objects to be used as virtual tables in QMF Data Service.

- Administrators now have the ability to specify whether the DB2 Analytics Accelerator should be used by QMF users when available (by database and query) through new resource limit options on the data source or object.

- QMF Workstation and QMF for WebSphere can now write data to the DB2 Analytics Accelerator. Data can be saved as Accelerator-only tables or Accelerator-shadow tables. Queries could then be created against this data, enabling them to take advantage of the DB2 Analytics Accelerator.

- QMF will detect DB2 Analytics Accelerator appliances and display these appliances under the data source. Users can also see tables that exist on the DB2 Analytics Accelerator and even add additional tables to the DB2 Analytics Accelerator by dragging and dropping tables into the appliance folder.

- QMF-prepped data will be made accessible as virtual tables or stored procedures to external applications through data service connectors such as:
  - Mainframe Data Service for Apache Spark on z/OS
  - Rocket DV
  - Rocket Mainframe Data Service on IBM Bluemix[(R)]
  - IBM DB2 Analytics Accelerator Loader

QMF Data Service (new) enables DB2 QMF to access numerous data sources and greatly eliminates the need to move data in order to perform your analytics. It enables you to obtain real-time analytics insights using a high-performance in-memory mainframe solution.

The need for real-time information requires a high-performance data architecture that can handle the extreme volumes and unique requirements of mainframe data and that is transparent to the business user. DB2 QMF's new data service includes several query optimization features, such as parallel I/O and MapReduce. Multiple parallel threads handle input requests, continually streaming and buffering data to the client. The mainframe MapReduce technology greatly reduces the elapsed time of the query by accessing the database with multiple threads that read the file in parallel.

Data definitions and schema information are extracted from a variety of places to create virtual tables. All of the implementation details are hidden to the user, presented instead as a single logical data source. The logical data source is easily administered through the new Eclipse-based QMF Data Service Studio. With QMF Data Service Studio, DB2 QMF now supports a broader range of data sources, including:

- Mainframe: Relational/nonrelational databases and file structures: ADABAS, DB2, VSAM, and Physical Sequential; CICS and IMS
- Distributed: Databases running on Linux[TM], UNIX[TM], and Microsoft[TM] Windows[TM] platforms: DB2, Oracle, Informix[(R)], Derby, and SQL Server
- Cloud and big data: Cloud-based relational and nonrelational data, and support for Hadoop

Data prepared in QMF will be made accessible as virtual tables to external applications through Data Service connectors such as:

- Mainframe Data Service for Apache Spark on z/OS
- Rocket DV
- Rocket Mainframe Data Service on IBM Bluemix
- DB2 Analytics Accelerator Loader

QMF Vision (new) is a web client visualization interface that enables you to create, modify, and drill down on data visualizations that are displayed on a dashboard. Users have the ability to drag and drop whatever dimensions or measures are needed, or add more variables for increased drill-down capability. Column, pie, treemap, geo map, line, scatter charts and many more chart objects are available. This gives a business user the ability to analyze data and provide insights that might not be readily apparent.

The most commonly requested guided analytics capabilities, such as outlier detection and cardinality, are now provided out of the box. These capabilities are integrated into the architecture for an intuitive analysis experience. For one-off decision making, you can quickly create simple reports using the tabular chart, which gives you a line-by-line view of summary data. Reports can be formatted to produce multilevel grouping, hierarchical structures, and dynamic cross tabulations, all for greater readability.

This enhancement simplifies the sharing of insights and collaboration with other users. Dashboards can be dropped into the chat window and other users can immediately start collaborating. They can discuss performance results, strategy, and

opportunities and discover new insights about the data. Users can connect to new data sources as well as work with existing QMF queries and tables.

QMF Classic Edition supports users working entirely on traditional mainframe terminals and emulators, including IBM Host On Demand, to access DB2 databases. QMF Classic Edition consists of the following capabilities in V12:

- QMF for TSO and CICS
- QMF Enhanced Editor
- QMF Analytics for TSO
- QMF High Performance Option (HPO)

Non-chargeable feature of DB2 12 for z/OS:

z/OS Application Connectivity to DB2 for z/OS consists of Universal Database Driver for z/OS Java™ Edition, a pure Java type 4 JDBC driver. It is designed to deliver high performance and scalable remote connectivity for Java-based enterprise applications on z/OS to a remote DB2 for z/OS database server.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the Product accessibility information website.

Section 508 of the US Rehabilitation Act

IBM DB2 12 for z/OS is capable as of October 21, 2016, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be requested at theProduct accessiblity informationwebsite.

Hardware and software support services

SmoothStart/installation services

IBM SmoothStart Services and Installation Services are offered in conjunction with general availability of this product.

Program number

Program number	VRM	Program name
5650-DB2	12.1.0	DB2 12 for z/OS
5615-DB2	11.1.0	DB2 11 for z/OS (QMF™ Enterprise Edition V12 and QMF Classic Edition V12 features only)

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld[(R)] ID and password are required (use IBMid).

BP Attachment for Announcement Letter 216-378

Technical information

Specified operating environment

Hardware requirements

Processors

DB2 12 operates on z196 or z114, or later, processors running z/OS V2.1, or later. The processors must have enough real storage to satisfy the combined requirements of:

- DB2 for z/OS
- z/OS
- The appropriate DFSMS storage management subsystem components, access methods, telecommunications, batch requirements, and other customer-required applications

DB2 12 will probably require increased real storage as compared to DB2 11 for z/OS.

The configuration must include sufficient I/O devices to support the requirements for system output, system residence, and system data sets. Sufficient disk storage must be available to satisfy the user's information storage requirements and can consist of any direct-access facility supported by the system configuration and the programming system.

Auxiliary storage

DB2 is independent of disk, solid-state devices (SSDs), and tape device type. You can use any magnetic, optical, or tape device that is supported by the data facilities component of DFSMS or the DB2 data sets. Tape products are not supported for databases but can be used for the DB2 archive log and utility functions.

The following DB2 data sets are supported by the following device types:

- Active recovery log data sets: disk
- Archive recovery log data sets: disk, tape
- Image copy data sets: disk, tape
- Bootstrap data sets: disk
- User data sets: disk, tape (if migrated by HSM)
- DB2 catalog data sets: disk
- Work data sets (for utilities): disk, tape

If these data sets are on disk that is shared with other z/OS systems, you should use global resource serialization to prevent concurrent access by more than one z/OS system.

The minimum disk space requirement, based on installing DB2 using the panel default values, is approximately 1.3 GB. You need additional disk space for your data.

If you use dual logging and tape for the log archiving device, you need at least two tape drives.

Data communication devices

DB2 operations can be controlled from:

- The system console
- Authorized IMS Transaction Manager terminals

- Authorized CICS terminals
- TSO terminals (by authorized users)

In addition to listing auxiliary storage and data communications devices, this section identifies function-dependent hardware requirements and virtual storage requirements.

Function-dependent hardware requirements for DB2

Certain functions of DB2 12 for z/OS have associated hardware requirements, as specified in the following list. If you do not use these DB2 functions, the hardware requirements do not apply.

- Date sharing requires the Coupling Facility. Refer to the latest Coupling Facility (CF) level recommended for your processor at the Parallel Sysplex^(R) website.
- DRDA^(R) data stream encryption uses the following ICSF APIs: CSNECKM, CSNERNG, CSNFPKB, CSNFPKE, CSNEENC, and CSNEDEC. Refer to *z/OS ICSF Application Programmer's Guide* for additional information on the usage of these APIs, including hardware requirements. However, if possible do not use DRDA encryption and instead secure connections by using the z/OS Communications Server IP Application Transparent Transport Layer Security (AT-TLS).
- DRDA AES user ID password encryption uses the following ICSF APIs: CSNEOWH, CSNERNG, CSNFPKB, CSNFPKE, CSNESYE, and CSNESYD. Refer to *z/OS ICSF Application Programmer's Guide* for additional information on the usage of these APIs, including hardware requirements.
- DSNLEUSR stored procedure uses the following ICSF APIs: CSNBCKM, CSNBENC, and CSNEDEC. Refer to *z/OS ICSF Application Programmer's Guide* for additional information on the usage of these APIs, including hardware requirements.
- Encryption and decryption functions: Built-in functions for encryption and decryption require cryptographic hardware in a cryptographic coprocessor, cryptographic accelerator, or cryptographic instructions.
- LOB Compression uses zEnterprise Data Compression hardware. The z/OS environment needs to have the zEDC card installed to trigger the data compression capability. The zEnterprise data compress zEDC requires the following:
  - z/OS V2.1 operating system
  - IBM zEnterprise EC12 (with GA2 level microcode) or IBM zEnterprise zBC12
  - zEDC Express^(R) feature, which is the z Systems compression accelerator that can improve the speed of data compression and is sharable across up to 15 partitions and up to 8 cards per CPU
  - zEDC Express software feature must be enabled in the IFAPRDxx parmlib member
- Single Instruction Multiple Data (SIMD) Exploitation with XML Parser requires both a z/OS processor and operating software APAR that supports SIMD instruction, as follows:
  - z13^{TM} processor, or above, supporting SIMD instruction
  - z/OS APARs:
    -- For z/OS V2.1: z/OS V2.1 APAR OA44545 and APAR OA49910 (see APAR descriptions below)
    -- For z/OS V2.2: z/OS V2.2 APAR OA49910
  - APAR OA44545 provides vector processing support for z13 processors that is included in z/OS V2.2.
  - APAR OA49910 allows IEAFP START when an EUT FRR is in effect.
- Asynchronous Duplexing of CF lock structure requires the following:
  - DB2 12 enabling APAR PI66689
  - IRLM 2.3 APAR PI68378
  - z/OS V2.2 with APAR OA47796 and APAR OA49148 (available October 28, 2016)

- CFCC (for current information see the Driver 27 Customer Exception letter at CFCC firmware specified service level)

Function-dependent hardware requirements for QMF V12.1 features

There are six installation entities across the QMF Enterprise Edition and QMF Classic Edition separately orderable, chargeable features.

QMF TSO and CICS clients' requirements:

- Operates on any z Systems hardware configuration that supports the required software.
- Runs on any processor that is supported by the operating system. Some operations, however, will not work with columns that contain decimal floating point data if the processor on which QMF is running does not support decimal floating point instructions.
- Accesses all of the DASD devices that are supported by z/OS and DB2 for z/OS, as well as all display devices supported by Graphical Data Display Manager (GDDM).
- To implement a national language feature that uses a double-byte character set (DBCS), you need a workstation that supports DBCS. Ensure that this device is supported by GDDM.
  - For the amount of storage required to copy the QMF V12.1 libraries from the distribution media using SMP/E, seethe QMF program directory that is appropriate for your QMF edition and national language.
- When you plan your region size, consider the storage required to load modules during initialization and the virtual storage requirements for report operations.
- Restriction: For TSO only, consider the amount of space required to run applications other than DB2 QMF.

DB2 QMF for Workstation requires:

- A hardware configuration that supports the Microsoft™ Windows™ operating system
- Network connectivity
- Minimum of 1 GB disk space and 1 GB of RAM

DB2 QMF for WebSphere requires:

- Hardware configuration that supports the Microsoft or Linux™ operating systems
- Minimum of 500 MB disk space
- Minimum of 1 GB of RAM on each server in which it is installed and an additional 50 MB of RAM for each concurrent user

DB2 QMF Vision requires:

- Hardware configuration that supports the Microsoft software
- Minimum of 250 GB disk space and 8 GB of RAM
- 4-core microprocessor

DB2 QMF Data Service requires:

- Operates on any z Systems hardware configuration that supports the required software
- Runs on any processor that is supported by the operating system

DB2 QMF Data Service Studio requires:

- Any hardware configuration that supports the required Microsoft software
- Approximately 1 GB of disk space (single language installation)
- Minimum of 1 GB of RAM

- Network connectivity

Software requirements

This section lists licensed programs or specific elements and features of licensed programs that are required in the DB2 12 environment. You can use subsequent versions or releases of the programs, unless stated otherwise. This section also identifies requirements that are associated with specific DB2 capabilities and optional programs that you can use with DB2 12. For the most current information, see the IT Infrastructure website.

Operating system and support programs

DB2 12 requires the function that is provided by the following licensed programs or their equivalents. Subsequent versions or releases of these products are acceptable.

- z/OS Version 2.1 Base Services (5650-ZOS), or later, with the following base and optional elements:
  - DFSMS V2.1, or later
  - Language Environment[R] Base Services
  - z/OS V2.1 Security Server (RACF[R]), or later
- IRLM V2.3 (delivered with DB2 12)

If DB2 12 is installed with IRLM V2.3 into the same SMP/E zone as any version of IMS with IRLM V2.3, IRLM V2R2 will be deleted during the SMP/E installation of IRLM V2.3

Notes:

- New functions are available only after new function is activated unless explicitly stated otherwise in the product documentation. A general exception exists for optimization and virtual storage.
- z/OS Unicode Services and appropriate conversion definitions are required. For additional information on Unicode conversions, refer to the *DB2 12 for z/OS Installation and Migration information* and also *Support for Unicode: Using Conversion Services,* SA22-7649.
- Some of the basic operation of a DBMS is provided by utility functions, such as backup, recovery, reorganization, loading and unloading data, gathering statistics and checking data, indexes, and large objects. Clients should ensure that these functions are provided either by ordering DB2 Utilities Suite for z/OS, V12.1 (5770-AF4) or by obtaining equivalent function elsewhere.

Virtual storage requirements

Most of DB2 data resides in shared memory of the DB2 address spaces, above the bar. DB2 12 requires 1 TB contiguous of 64-bit shared private storage above the 2 GB bar for each DB2 subsystem. This storage is virtual, controlled by the z/OS HVSHARE parameter in IEASYSxx. This storage is not backed at allocation, only as it is used. Most control blocks and buffers reside in the extended private area above the 2 GB bar, while modules and some data resides above the 16 MB line, but below the 2 GB bar.

The amount of space needed for the common service area (CSA) below the 16 MB line is less than 40 KB for each DB2 for z/OS subsystem and 24 KB for each IRLM subsystem. High concurrent activity, parallelism, or high contention can require more E/CSA. The amount of 64-bit above the bar common storage needed for each DB2 subsystem is a minimum of 6 GB contiguous controlled by the z/OS HVCOMMON parameter in IEASYSxx. Configure additional megabytes of 1MB LFAREA for maximum benefit.

DB2 12 requires that data sets for the catalog and directory reside on SMS-managed storage. These data sets must belong to an SMS data class that is defined with

the extended addressability (EA) attribute. See prefix.SDSNSAMP(DSNTIJSS) for a sample SMS environment.

Function-dependent program requirements

The following functions of DB2 require specific licensed programs or features of licensed programs before they can be used.

Application execution: Applications written in high-level programming languages, such as applications or stored procedures written in the C language and using the ODBC or CLI interfaces to DB2, require Language Environment at run time. Applications or stored procedures written in Java™, such as those using the JDBC or SQLJ interfaces to DB2, require IBM SDK for z/OS, Java 2 Technology Edition V6, or later, at runtime.

Requirements for dependent functions of DB2 12 for z/OS

Before using these features, see the installation information for these features to ensure you have all required and recommended products.

- System-level Point-in-Time (PIT) Backup and Recovery function needs:
  - DFSMShsm
  - DFSMSdss
  - FlashCopy V1 (required for volume-level FlashCopy support for system-level backup and recovery)
  - FlashCopy V2 (required for data-level FlashCopy, enabling object-level recovery from system-level backup and FlashCopy image copy)
- Encryption and decryption functions
  - Built-in functions for encryption and decryption require z/OS Cryptographic Services Integrated Cryptographic Service Facility (ICSF).
- DRDA Data Stream Encryption can optionally use z/OS Cryptographic Services Facility (ICSF).

Requirements for dependent functions of the QMF features

QMF for TSO and CICS clients require:

- IBM z/OS, V2.1, or later (5650-ZOS)
- One of the following IBM DB2 for z/OS releases:
  - DB2 for z/OS, V11 (5615-DB2)
  - DB2 for z/OS Value Unit Edition, V11 (5697-P43)
  - DB2 for z/OS, V12 (5650-DB2)
  - DB2 for z/OS Value Unit Edition, V12 (5770-AF3)

QMF for Workstation requires one of the following operating systems:

- Microsoft Windows Vista
- Windows 7
- Windows 8
- Windows Server 2008
- Windows Server 2012
- Windows 10

QMF for WebSphere requires:

- One of the following application web servers:
  - IBM WebSphere Application Server 7 or WebSphere Application Server 8 (
    Note: QMF V12.1 has only been tested with WebSphere Application Server 8.5 and later.)

- Apache Tomcat 7 or Apache Tomcat 8 DB2
- To enable Data Service connectivity, Java 7, or later, is required. (**Note:** QMF V12.1 uses the Data Server JDBC driver, which only supports Java 7, or later.)

QMF Vision installation entities requires:

- One of the following operating systems:
  - Windows 7 64-bit, Windows Server 2008 R2 Service Pack 1, or Windows Server 2012 with .NET Framework 3.5 enabled
- One of the following browsers:
  - Chrome version 50.0.2661.102, or later
  - Firefox version 47.0.1, or later
  - Microsoft Edge version 25.10586.0.0, or later
  - Safari version 9.0.3, or later

DB2 QMF Data Service installation entities requirements:

- IBM zEnterprise 114 (z114), IBM zEnterprise 196 (z196), or more recent IBM zEnterprise system
- IBM z/OS, V2.1, or later (5650-ZOS)

Data Service load library

- The load library for Data Service is allocated as a partitioned data set extended (PDSE). When a PDSE is used to store load modules, it stores them in structures called *program objects.*
- You cannot copy a PDSE to a partitioned data set (PDS). For more information, see the IBM z/OS documentation.

Program Temporary Fixes (PTFs)

- When you use VSAM data access with Data Service, you need to add the following PTFs:
  - RLS OA44111:
    -- z/OS V1.13 UA75045
    -- z/OS V2.1 UA75046
  - VSAM:
    -- z/OS V1.13 UA75272

The QMF Data Service Studio installation entity requires one of the following operating systems:

- Windows 8, Windows 7, Windows Vista, Windows Server 2012, Windows Server 2008, or Windows 10

Mandatory operational requisites of the QMF features

The TSO and CICS clients of QMF V12.1 operate with:

- DB2 for z/OS, V10 (5605-DB2) (all modes except CM8, CM8, ENFM8, ENFM8) with APARs PM50434 and PM72274
- DB2 for z/OS Value Unit Edition (5697-P31) (all modes except CM8, CM8, ENFM8, ENFM8) with APARs PM50434 and PM72274
- DB2 for z/OS, V11 (5615-DB2)
- DB2 for z/OS Value Unit Edition, V11 (5697-P43)
- DB2 for z/OS, V12 (5650-DB2)
- DB2 for z/OS Value Unit Edition, V12 (5770-AF3)

In addition:

- For advanced graphical capabilities of the QMF Analytics for TSO client, GDDM-PGF, a component in z/OS, is required.
- DB2 QMF for TSO and CICS running under CICS requires CICS Transaction Server for z/OS.
- QMF Vision requires MongoDB 3.X , or later, to be installed. This is done when the optional QMF Vision component is selected during the QMF install and you are asked to download/install Mongo during this part of the QMF install.

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a readme file, or other information published by IBM, such as an announcement letter. Documentation and other program content may be supplied only in the English language.

Limited-use license for z/OS Application Connectivity to DB2 for z/OS

The zero-priced z/OS Application Connectivity to DB2 feature, a Type 4 JDBC driver, is licensed for installation and use solely on z/OS. Its sole authorized use is limited to connecting an application that runs on z/OS to Version 10, 11, or 12 of DB2 for z/OS running in a separate partition on the same server as the application or on a different z/OS server. You can also connect applications to a subsequent supported version of DB2 UDB for z/OS. Authorized use does not extend to applications that run on Linux or any other platform or operating system.

Optional program requirements

The following functions are enabled in conjunction with the specified optional licensed programs when used together with DB2. Note that the information is for expected toleration support for DB2 12.

Connectivity

For database applications that run on Linux, UNIX™, or Windows operating systems, clients can use DB2 Connect, and then perform one of the following actions:

- Install the IBM Data Server Driver package and deploy one of the client drivers to access DB2 for z/OS through a DB2 Connect Server.
- Install the IBM Data Server Driver package and deploy one of the provided client drivers to access DB2 for z/OS directly.

Both of these approaches, direct access or access through the gateway, provide runtime support to access DB2 by applications that use ODBC, CLI, .NET, OLE DB, PHP, Ruby, JDBC, pureQuery[(R)], JPA, SQLJ, Python, Perl, and more. These approaches can be used alone or in combination, as needed.

It is recommended to use one of the client drivers provided with the IBM Data Server package (without the use of a DB2 Connect server) when accessing a remote DB2 for z/OS subsystem. To choose the right IBM Client Package for your needs, see the *IBM DB2 10.5 for Linux, UNIX and Windows* documentation at IBM Knowledge Center.

DB2 for z/OS supports DRDA as an open interface, enabling access from any client.

DB2 Connect V10.5 with the latest fix pack is the minimum requisite for DB2 12 for z/OS. All versions can access DB2 12 for z/OS, and special builds can be provided to exploit some of the DB2 12 features requiring IBM Data Server Changes, such as the following features:

- A new client API to provide fast loading from mobile devices
- A new client API to determine the DB2 function level
- Support for continuous delivery
- Improved security and scalability for client Sysplex workload balancing

- Improved Sysplex support for distributed global transactions
- Support for preserving prepared dynamic statements after a ROLLBACK
- Improved client serviceability aids

DB2 12 acting as a client supports the following relational database products:

- IBM DB2 Advanced Enterprise Server Edition for Linux, UNIX, and Windows, V10.5, or later (5725-L47)
- IBM DB2 Enterprise Server Edition for Linux, UNIX and Windows, V9.7, or later (5765-F41)
- IBM DB2 Advanced Workgroup Server Edition for Linux, UNIX, and Windows, V10.5, or later (5725-L15),
- IBM DB2 Workgroup Server Edition for Linux, UNIX, and Windows V9.7, or later (5765-F35)
- IBM DB2 Developer Edition, V9.7, or later (5724-N76)
- Any other DRDA-compliant relational DBMS server

Web connectivity is provided by any of the DB2 Connect clients using one of the IBM Data Server clients or drivers.

For support services, go to the IBM Software website.

JDBC

DB2 12 supports the following JDBC APIC specification levels:

JDBC 3.0 API requires any of the following at run time:

- IBM 31-bit SDK for z/OS, Java Technology Edition, V7 (SDK7) (5655-W43), or later
- IBM 64-bit SDK for z/OS, Java Technology Edition, V7 (SDK7) (5655-W44), or later
- IBM 31-bit SDK for z/OS, Java Technology Edition, V6 (SDK6) (5655-R31), or later
- IBM 64-bit SDK for z/OS, Java Technology Edition, V6 (SDK6) (5655-R32), or later

JDBC 4.0 API requires any of the following at run time:

- IBM 31-bit SDK for z/OS, Java Technology Edition, V7 (SDK7) (5655-W43), or later
- IBM 64-bit SDK for z/OS, Java Technology Edition, V7 (SDK7) (5655-W44), or later
- IBM 31-bit SDK for z/OS, Java Technology Edition, V6 (SDK6) (5655-R31), or later
- IBM 64-bit SDK for z/OS, Java Technology Edition, V6 (SDK6) (5655-R32), or later

For more information on SDKs, go to the IT Infrastructure website and the IBM developer kits lifecycle dates website.

The following transaction management products work with DB2 12:
- Information Management System (IMS)
    - IMS V14 (5635-A05)
    - IMS V13 (5635-A04)

- Customer Information Control System (CICS)
    - CICS Transaction Server for z/OS, V5.1, V5.2, and V5.3 (5655-Y04), or later
    - CICS Transaction Server VUE for z/OS, V5.1, V5.2, and V5.3 (5722-DFJ), or later

– CICS Transaction Server for z/OS, V4.1 and V4.2 (5655-S97), or later

Query support

The following query program works with DB2 12:

• IBM DB2 Query Management Facility™ (QMF) family of products, Version 11 and 12

Programming languages

The following application development programming languages can be used to build applications for DB2 12:

Building applications using a DB2 precompiler:

• Assembler
  – High Level Assembler, part of the System Services element of z/OS
• C/C++
  – C/C++ (without Debug Tool), which is an optional priced feature of z/OS
• COBOL (one of the following):
  – Enterprise COBOL for z/OS, V3.4 (5655-G53)
  – Enterprise COBOL for z/OS, V4.1 (5655-S71), or later
  – Enterprise COBOL for z/OS, V5.1 (5655-W32)
• Fortran
  – VS Fortran V2.6 (5668-806, 5688-087, 5668-805); new data types and new SQL functions are not supported since DB2 9 for z/OS.
• PL/I
  – Enterprise PL/I for z/OS, V3.9 (5655-H31)
  – Enterprise PL/I for z/OS, V4.1 (5655-W67), or later

Building applications using a DB2 coprocessor:

• C/C++
  – C/C++ (without Debug Tool), which is an optional priced feature of z/OS
• COBOL (one of the following):
  – Enterprise COBOL for z/OS, V3.4 (5655-G53)
  – Enterprise COBOL for z/OS, V4.1 (5655-S71), or later
  – Enterprise COBOL for z/OS, V5.1 (5655-W32)
• PL/I (one of the following):
  – Enterprise PL/I for z/OS, V3.9 (5655-H31)
  – Enterprise PL/I for z/OS, V4.1 (5655-W67), or later

Building applications that are not supported with a precompiler or coprocessor:

• Java: Applications or stored procedures written in Java, such as those using the JDBC or SQLJ interfaces to DB2, require IBM 31-bit SDK for z/OS, Java Technology Edition, V6 (SDK6) (5655-R31), or later, at run time. Optionally, the following may be used for applications written in Java:
  – IBM 64-Bit SDK for z/OS, Java Technology Edition, V6 (SDK6) (5655-R32), or later, at run time
  – **Note:** PIDs 5655-R31 and 5655-R32 are independent products and can coexist on the same z/OS system.

For more information on SDKs, go to the IT Infrastructure website and the IBM developer kits lifecycle dates website.

- REXX
  - z/OS V2R1 TSO/E REXX Reference (5650-ZOS)
- SQL Procedure Language
  - Native SQL Procedure Language
  - External SQL Procedure Language, which requires a C language compiler

- APL2^(R) (one of the following):
  - Mainframe APL2 V2.2 (5688-228) (full APL2)
  - APL2 Application Environment (5688-229)

Operational support

The following programs provide operational support for DB2 12:

DFSMS features, part of the Systems Management optional feature of z/OS, specifically:

- DFSMShsm for archiving
- DFSMSdss for concurrent copy in utilities

Tools support

The following tools are the minimum level that provide support for DB2 12 for z/OS. For details on any additional requirements, go to the DB2 Tools Compatibility for DB2 12 for z/OS website.

IBM Tools for Database Administration and System Management Support, including the following tools:

- DB2 Administration Solution Pack for z/OS, V2.2 (5697-DAQ)
- DB2 Administration Tool for z/OS, V11.2 (5655-DAT), with APAR PI67731, or higher
- DB2 Configuration Manager for z/OS, V4.1 (bundled in the DB2 Admin Solution Pack V2.2 (5697-DAQ))
- DB2 Object Comparison Tool for z/OS, V11.2 (5655-DOC)
- DB2 Query Workload Tuner for z/OS, V5.1 (5655-AB4)
- InfoSphere^(R) Guardium^(R) Data Encryption for IMS and DB2 Databases, V1.2 (5655-P03)

IBM Tools for Database Application Management, including the following tools:

- IBM DB2 Analytics Accelerator for z/OS, V5.1 (5697-DA5)
- IBM DB2 Analytics Accelerator Loader for z/OS, V2.1 (5639-OLE)
- IBM Application Performance Analyzer for z/OS, V13.1 (5655-Q09)
- IBM DB2 Table Editor for z/OS, V4.5 (5697-G65)
- IBM Debug Tool for z/OS, V13.1 (5655-Q10)
- IBM Fault Analyzer for z/OS, V13.1 (5655-Q11)
- IBM File Manager for z/OS, V13.1 (5655-Q12)

IBM Tools for Performance Management, including the following tools:

- DB2 Management Solution Pack for z/OS, V1.1 (5655-MSP)
- DB2 Performance Solution Pack for z/OS, V1.4 (5655-E74)
- DB2 Query Monitor for z/OS, V3.2 (5655-V42)

- DB2 SQL Performance Analyzer for z/OS, V5.1 (5697-W51)
- IBM Tivoli^(R) OMEGAMON^(R) XE for DB2 Performance Expert on z/OS, V5.3 (5655-W37)

IBM Tools for Replication Management, including the following tools:

- IBM InfoSphere Data Replication for DB2 for z/OS, V10.2.1 (5655-DRP), with APAR PI49204

IBM Tools for Utilities Management, including the following tools:

- DB2 Utilities Solution Pack for z/OS, V3.1 (5697-USP)
- DB2 Extended Utilities Suite for z/OS, V1.1 (5655-EUS)
- DB2 Automation Tool for z/OS, V4.2 (5655-E37)
- DB2 Cloning Tool for z/OS, V3.2 (5655-N15)
- DB2 High Performance Unload for z/OS, V4.3 (5655-AA1)
- DB2 Sort for z/OS, V2.1 (5655-AA9)
- DB2 Utilities Enhancement Tool for z/OS, V2.2 (5655-T58)
- DB2 Utilities Suite for z/OS, V12.1 (5770-AF4)

Compatibility

DB2 12 for z/OS is upwardly compatible with earlier releases of DB2 for z/OS. Migration with full fallback protection is available for clients who are running on DB2 11 for z/OS. Existing clients should ensure that they are successfully running on DB2 11 for z/OS (in new-function mode) before migrating to DB2 12 for z/OS. Fallback SPE APAR PI33871 must be applied.

DB2 12 APAR PI69143 extends APPLCOMPAT to support controlling the use of new DB2 12 function for DDL and DCL (GRANT, REVOKE, TRANSFER) in DB2 12. Application of APAR PI69143 is required prior to starting DB2 to ensure that objects created with DB2 12 dependent capability or function are properly recorded in the DB2 catalog.

Clients should also use FIX CATEGORIES IBM.Migrate-Fallback. DB2.V12 and IBM.Coexistence. DB2.SYSPLEXDataSharing to identify and apply fixes that enable prior releases of DB2 to migrate to or fallback from DB2 12 for z/OS and fixes that enable DB2 11 to co-exist when in data sharing mode, respectively.

For more information on FIXCAT, go to the IBM Fix Category Values and Descriptions website.

User group requirements

This announcement satisfies or partially satisfies many requirements from one or more of the worldwide user group communities:

RFE number	Request For Enhancement (RFE) Description
19295	Add ""Time Machine Function"" to temporal tables feature in DB2 for z/OS
19313	Select a certain number of rows (hostvariable :n) from a union of two tables
20059	Automatic REBIND to use OWNERs authid when using RACF exit
20060	FREE INACTIVE Selectivity
20121	LPL restrictive state should be recovered during DB2 light restart when LPAR failure occurs on DB2 for z/OS V10.1.0
20124	Prevent long-running pseudo-close in DS member from causing time-outs
20930	Use of alias for sequences

RFE number	Request For Enhancement (RFE) Description
21662	Add ""Time Machine Function"" for ""AS OF"" function to temporal tables in DB2 z/OS V10
22119	RUNSTATS -- Option to reset DB2 objects to default statistics (-1)
22247	Adding COLLECTION ID character length support for 128 characters
22441	counter requirement on EO support for v11
22630	Group-level Automatic GRECP completion message
22900	Implement FREQVAL parameters for REORG utility
22953	Avoid to close DB2 each time customer has to remove a RACF permit.
23261	Enhance Resource Limit Facility to include ability to limit STATIC SQL calls from bound plans/packages
23265	Drop of unused columns anywhere in a table
23468	OUTER JOIN PERFORMANCE
23539	CICS TS for z/OS should provide runaway task timeout support for DB2 transactions that consume excessive CPU reso
23963	UNLOAD utility: limiting number of parallel unloaded partitions not possible
24013	SORT before JOIN
24307	SAP FR493: Provide breakdown of wait time in IFCID 316 as detailed as class 3 wait times in accounting data
24309	SAP FR533: Piece-wise DELETE and UPDATE
24454	Enhance Resource Limiting for CICS transactions processing in DB2
24504	NPI inline stats when SORTNPSI YES is specified
25720	In DB2 10 introduce a new built-in function, named for example CHA9 with the same behavior as DB2 v9 CHAR(DECIMAL)
25941	230-VLDB2011: Remove Empty Partitions from PBG Tables During Reorg
25950	207-VL DB2 009: DB2 BACKUP SYSTEM support of multiple copypool backup storage groups
26052	Provide part-number in lock escalation message
26492	Allow BIND to have DBRMs with long and camel cased names in zFS files as input
26610	Need DB2 support for BACKUPSTORAGEGROUP in BACKUP SYSTEM
26629	Enhancements needed for Mass Data Changes
26676	Enhancement to Cost Model for XML Index Selection
26687	Support pending (deferred) alter limit keys
27089	Reorg in Partition By Growth tablespaces
27418	FR547: Extend NPGTHRSH optimizer behavior to default stats
28439	Inline Stats for NPI when Reorg on part-level

RFE number	Request For Enhancement (RFE) Description
28456	UNLOAD privilege for UNLOAD Utility
29249	FREE INACTIVE PACKAGES For Native SQL Procedures
29348	Option to Enable/Disable the Generate DDL for stored procedures and UDFs to avoid to see the business logic/secured information
30299	Have a HASH scalar function in DB2
31183	Improve performance of SQL MAX function
31647	COMPACT=YES is applicable for modern ""tape"" systems
33868	Save the APCOMPARE statistics shown by message DSNT285I to explain for later reporting
34499	more aggressive DDL change
34833	Extend MERGE to allow table/view/select expression as input
36560	Physically delete empty partitions on PBGs
36709	Add 'Full Optimized Date/Release' to SYSPACKAGE to record Optimization Info
39355	FR560: Fail REORG if FlashCopy image copy specified and cannot be used
39554	Option to specify COMMIT SIZE
40981	Resource Limit Facility (RLF) performance
41636	FR103: Preserve local dynamic statement cache at ROLLBACK
41643	3FR561: Declaim read claims on catalog objects directly after PREPARE
42016	FR564: Ensure part-level REORG completes
42417	DSNACCOX behaviour
42997	Expand DASD_USAGE in ADMIN_DS_LIST
43725	Enable RUNSTATS profiles for INLINE statistics
44051	FR567: Query performance with table functions
44324	Support for multiple actions in SQL PL Trigger (RFE_44324) (should be 'multiple-event triggers')
44339	Retain SYSPACKAGE LASTUSED date across Bind(Replace) activity
44998	AP selection LIST PREFETCH (MXI)
45382	Provide a new column attribute: generated always as user
45976	New SQL SELECT WHERE clause construction with a better optimizer path
46195	DSNU1375I on RUNSTATS with SAMPLE
46255	Request for a parameter in DB2 z/OS equivalent to the parameter IGNOREWARNINGS available in DB2 LUW into db2cli.ini file
46720	Performance bottleneck in ODBC Driver at multithreaded applications
46815	FR576: Provide HEXTOBIN as built-in function
46817	FR577: Dynamic SQL in scalar SQL PL UDFs
48757	Hard to analyze SQL statements due to lack of stable identifiers
48764	One step migration support for DB2 from one version to the next.

RFE number	Request For Enhancement (RFE) Description
50994	Provide the statement level section located out of QWT02R30 for IFCIDS 53/58 for PREPARE statements
52871	Remove Limitation for MERGE Statement
52982	GBP page registration algorithm
53328	FR579: INSERT statements - read non-leaf index pages using async I/O
55020	load replace into table with IDENTITY column
60065	Scrollable cursor support with context for JDBC applications
60837	Improving OUTER JOIN performance
60858	353 VLDB2014 - Show values used to bind SQL statements in the DBACOCKPIT
61266	How to differentiate CM from ENFM mode, from a program/software
62345	Allow RLF to limit static SQL
62496	""ATTACH(ULI)"" -DB2-Precompiler/ Coprocessor: Create additional option like ATTACH(ULI)
63318	381 VLDB - Materialise pending database changes via partition level REORGs
63663	RUNSTATS should allow collection of the percent of frequency for a specific column value
64314	Increase max number of tables referenced in view/UDF/statement
64522	Provide parameter ACTION(DELETE) for program DSNTWLMB
65465	UPPER/LOWER case folding - SAP-specific locale
65522	IBA0314-1687 Have stable identifiers for all SQL statements
65549	IDB1013-1647 DB2 statement cache optimisation
65636	IDAT1211-1471 Unicode support on DB2 column level
66391	Extend the performance enhancement implemented for 'In-List' processing to more than 129 elements
66447	Increase the REORG usability on PBG tablespaces
68365	Use results of index probing more broadly to estimate composite cardinalities
68539	MODIFY RECOVERY 'NOCOPYPEND'
68660	Enhance the possibility of merging a materialized query block that is generated for LEFT OUTER JOIN
70945	Query performance is very bad in DB2/ zOS if the view with VALUE function is joined with OUTER JOIN.
71967	Rebind Packages with /
72668	Improve Filter Factor for Current Date - 1 DAYS
74784	DB2 z server should support TM using multi transport model
75746	IBAC0311-1390 Enhance Resource Limit Facility to include ability to limit STATIC SQL calls from bound plans/packages
75756	PSCHWAB0410-1336 FREE INACTIVE Selectivity

RFE number	Request For Enhancement (RFE) Description
77173	DSNTIJRT option to install and maintain DB2 supplied MQI functions DB2MQ.* with option SECURITY USER

Planning information

Customer responsibilities

Review the sections in this announcement that describe the hardware and software dependencies for DB2 12 and QMF V12 features.

Migration considerations

DB2 12 is upwardly compatible with earlier releases of DB2 for z/OS. Migration with full fallback protection is available for clients running on DB2 11 for z/OS. Existing clients should ensure that they are successfully running on DB2 11 for z/OS (NFM) before migrating to DB2 12 for z/OS. Fallback SPE APAR PI33871 must be applied. Clients should also use FIX CATEGORIES IBM.Migrate-Fallback. DB2.V12 and IBM.Coexistence. DB2.SYSPLEXDataSharing to identify and apply fixes that enable prior releases of DB2 to migrate to or fallback from DB2 12 for z/OS and fixes that enable DB2 11 to co-exist when in data sharing mode, respectively.

For more information on FIXCAT, go to the IBM Fix Category Values and Descriptions website.

Deprecated functions

During migration, be aware of the functions that are deprecated in DB2 12. Although they are supported in DB2 12, support for these functions might be removed in the future. Avoid creating new dependencies that rely on these functions, and if you have existing dependencies on them, develop plans to remove these dependencies.

The following functions are deprecated in DB2 12:

Resource limit table formats: DSNRLMTxx table formats and related index formats earlier than the DB2 11 format are deprecated in DB2 12. If tables with deprecated formats are detected, DB2 issues message DSNT732I, processing for the START RLIMIT command continues, and the resource limit facility starts using the deprecated objects.

Some BIND PLAN and REBIND Plan command options are no longer supported:

- The MEMBER option of BIND PLAN and REBIND PLAN is no longer supported. If you specify MEMBER, DB2 issues a warning message, binds the specified DBRM into a package, and binds the package into a plan.

The following subsystem parameters are deprecated in DB2 12:

- MATERIALIZE _NODET_SQLTUDF

  - In later DB2 releases, user-defined SQL table functions that are not defined with NOT DETERMINISTIC always behave as if MATERIALIZE_NODET_SQLTUDF is set to YES.

For current information on DB2 12 deprecated functions, go to IBM Knowledge Center.

Direct customer support

Direct customer support is provided by IBM Operational Support Services - SoftwareXcel Enterprise Edition or SoftwareXcel Basic Edition. These fee services can enhance your productivity by providing voice and electronic access into the IBM support organization. IBM Operational Support Services - SoftwareXcel Enterprise

Edition or SoftwareXcel Basic Edition will help answer questions pertaining to usage, how-to, and suspected software defects for eligible products.

Installation and technical support is provided by IBM Global Services. For more information on services, call 888-426-4343.

Eligible customers can obtain installation and usage assistance from the Industry Support Center through a telephone response line.

Packaging

The following materials are included with the base and optional features of DB2 12:

Title	Publication number
DB2 12 for z/OS (5650-DB2)	
DB2 12 for z/OS feature:	
Program Directory (ENU and JPN)	GI13-4624
License Program Specifications (ENU and JPN)	GC27-8853
QMF Classic Ed 12 feature:	
Program Directory (ENU)	GI13-4625
Program Directory (MUL)	GI13-4626
QMF Enterprise Ed 12 feature:	
Program Directory (ENU)	GI13-4627
Program Directory (MUL)	GI13-4628
QMF distributed components DVD (ENU and MUL)	LK5T-8907
z/OS Application Connect feature:	
Program Directory (ENU)	GI13-4629

The following materials are included with the new QMF V12 optional features of DB2 11:

Title	Publication number
DB2 11 for z/OS (5615-DB2)	
QMF Classic Edition V12 feature:	
Program Directory (ENU)	GI13-4633
Program Directory (MUL)	GI13-4634
QMF Enterprise Edition V12 feature:	
Program Directory (ENU)	GI13-4635
Program Directory (MUL)	GI13-4636
QMF distributed components DVD (ENU and MUL)	LK5T-8907

Security, auditability, and control

DB2 12 for z/OS uses the security and auditability features of the host z/OS systems. It also provides facilities for the protection and control of its resources. These facilities include controls for:

- System access
- Data access and control
- Concurrent access
- Data recovery
- Accounting and auditing

The client is responsible for evaluation and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering information

The information for the features in this announcement cannot be ordered in hardcopy. The information will be available on the product availability date in IBM Knowledge Center:

- *DB2 12 for z/OS Administration Guide*
- *DB2 12 for z/OS Application Programming and SQL Guide*
- *DB2 12 for z/OS Application Programming Guide and Reference for Java*
- *DB2 12 for z/OS Codes*
- *DB2 12 for z/OS Command Reference*
- *DB2 12 for z/OS Data Sharing: Planning and Administration*
- *DB2 12 for z/OS Installation and Migration*
- *DB2 12 for z/OS Internationalization Guide*
- *DB2 12 for z/OS Introduction to DB2 for z/OS*
- *DB2 12 for z/OS IRLM Messages and Codes for IMS and DB2 for z/OS*
- *DB2 12 for z/OS License Program Specifications*
- *DB2 12 for z/OS Managing Performance*
- *DB2 12 for z/OS Managing Security*
- *DB2 12 for z/OS Messages*
- *DB2 12 for z/OS ODBC Guide and Reference*
- *DB2 12 for z/OS RACF Access Control Module Guide*
- *DB2 12 for z/OS SQL Reference*
- *DB2 12 for z/OS Utility Guide and Reference*
- *DB2 12 for z/OS What's New?*
- *DB2 12 for z/OS pureXML$^{(R)}$ Guide*

The *DB2 for z/OS Diagnosis Guide and Reference,* which has been available in previous versions of DB2 as a licensed publication, is not available for DB2 12. Much of the content of that publication is now available in IBM Knowledge Center, under "Troubleshooting problems in DB2." The remainder of the content is available to users who have DB2 12 licenses, in entitled techdocs on the web.

- *Introducing QMF*
- *Installing and Managing QMF for TSO and CICS*
- *Developing QMF Applications*
- *Using QMF*
- *QMF Reference*
- *QMF Messages and Codes*
- *QMF High Performance Option User's Guide for TSO and CICS*
- *Installing and Managing DB2 QMF for Workstation and DB2 QMF for WebSphere*
- *Getting Started with DB2 QMF for Workstation and DB2 QMF for WebSphere*
- *IBM DB2 QMF Data Service Getting Started Guide*
- *IBM DB2 QMF Data Service Studio User's Guide*
- *IBM DB2 QMF Data Service Solutions Guide*
- *IBM DB2 QMF Data Service Customization Guide*
- *Getting Started with IBM QMF Vision*

Ordering z/OS through the internet

Shopz provides an easy way to plan and order your z/OS ServerPac or CBPDO. It will analyze your current installation, determine the correct product migration, and present your new configuration based on z/OS. Additional products can also be added to your order (including determination of whether all product requisites are satisfied). Shopz is available in the US, Canada, and several countries in Europe. In countries where Shopz is not available yet, contact your IBM representative (or IBM Business Partner) to handle your order through the traditional IBM ordering process. For more details and availability, go to the Shopz website.

New licensees

Orders for new licenses can be placed now. Registered customers can access IBMLink for ordering information and charges. Shipment will not occur before the availability date.

New users of DB2 12 for z/OS should specify:

Type: 5650 Model: DB2

New/existing users of DB2 11 for z/OS (to order the new QMF V12 features) should specify:

Type: 5615 Model: DB2

Parallel Sysplex license charge (PSLC) basic license

To order a basic license, specify the program number and quantity of MSU.

If there is more than one program copy in a Parallel Sysplex, the charge for all copies is associated to one license by specifying the applicable PSLC license options and quantity represented by the sum of the Service Units in Millions (MSUs) in your Parallel Sysplex. For all other program copies, specify the System Usage Registration No-Charge (SYSUSGREG NC) Identifier on the licenses.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, PSLC below 3 MSU
S017GWJ	DB2 12 for z/OS	Basic MLC, PSLC AD
S017GWJ	DB2 12 for z/OS	SYSUSGREG NC, PSLC AD
S01822D	QMF Enterprise Ed 12	Basic MLC, PSLC below 3 MSU
S01822D	QMF Enterprise Ed 12	Basic MLC, PSLC AD
S01822D	QMF Enterprise Ed 12	SYSUSGREG NC, PSLC AD
S01822F	QMF Classic Ed 12	Basic MLC, PSLC below 3 MSU
S01822F	QMF Classic Ed 12	Basic MLC, PSLC AD
S01822F	QMF Classic Ed 12	SYSUSGREG NC, PSLC AD

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, PSLC below 3 MSU

Entitlement identifier	Description	License option/Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, PSLC AD
S0181TM	QMF Enterprise Edition V12	SYSUSGREG NC, PSLC AD
S0181TL	QMF Classic Edition V12	Basic MLC, PSLC below 3 MSU
S0181TL	QMF Classic Edition V12	Basic MLC, PSLC AD
S0181TL	QMF Classic Edition V12	SYSUSGREG NC, PSLC AD

Advanced Workload License Charges (AWLC) basic license

To order a basic license, specify the program number and quantity of MSUs. If there is more than one program copy in a Parallel Sysplex, the charge for all copies is associated to one license by specifying the applicable AWLC license options and quantity represented by the sum of the Service Units in Millions (MSUs) in your Parallel Sysplex. For all other program copies, specify the System Usage Registration No-Charge (SYSUSGREG NC) Identifier on the licenses.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, AWLC
S01822D	QMF Enterprise Ed 12	Basic MLC, AWLC
S01822F	QMF Classic Ed 12	Basic MLC, AWLC

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, AWLC
S0181TL	QMF Classic Edition V12	Basic MLC, AWLC

Advanced Entry Workload License Charges (AEWLC) basic license

To order a basic license, specify the program number and quantity of MSUs.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, AEWLC
S01822D	QMF Enterprise Ed 12	Basic MLC, AEWLC
S01822F	QMF Classic Ed 12	Basic MLC, AEWLC

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, AEWLC
S0181TL	QMF Classic Edition V12	Basic MLC, AEWLC

Workload License Charge (WLC) Basic License

If there is more than one program copy in a Parallel Sysplex, the charge for all copies is associated to one license by specifying the applicable WLC license options

and quantity represented by the sum of the Service Units in Millions (MSUs) in your Parallel Sysplex. For all other program copies, specify the Workload Registration Variable WLC Identifier on the licenses.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, Variable WLC
S017GWJ	DB2 12 for z/OS	Workload Registration, Variable WLC
S01822D	QMF Enterprise Ed 12	Basic MLC, Variable WLC
S01822D	QMF Enterprise Ed 12	Workload Registration, Variable WLC
S01822F	QMF Classic Ed 12	Basic MLC, Variable WLC
S01822F	QMF Classic Ed 12	Workload Registration, Variable WLC

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, Variable WLC
S0181TM	QMF Enterprise Edition V12	Workload Registration, Variable WLC
S0181TL	QMF Classic Edition V12	Basic MLC, Variable WLC
S0181TL	QMF Classic EditionV12	Workload Registration, Variable WLC

Workload License Charge (WLC) Basic License

To order a basic license, specify the program number and the quantity of MSUs.

Country Multiplex Pricing Charges

CMLC is a new sub-capacity offering that allows clients to use their z Systems capacity within a given country without the constraints of sysplex aggregation rules and many of the limitations of previous reporting methodologies.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, CMLC
S01822D	QMF Enterprise Ed 12	Basic MLC, CMLC
S01822F	QMF Classic Ed 12	Basic MLC, CMLC

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, CMLC
S0181TL	QMF Classic Edition V12	Basic MLC, CMLC

CMLC is a new sub-capacity offering that allows clients to use their z Systems capacity within a given country without the constraints of sysplex aggregation rules and many of the limitations of previous reporting methodologies.

Entry Workload License Charge (EWLC) Basic License

To order a basic license, specify the program number and the quantity of MSUs.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, Entry WLC
S01822D	QMF Enterprise Ed 12	Basic MLC, Entry WLC
S01822F	QMF Classic Ed 12	Basic MLC, Entry WLC

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/Pricing metric
S0181TL	QMF Classic Edition V12	Basic MLC, Entry WLC
S0181TM	QMF Enterprise Edition V12	Basic MLC, Entry WLC

S/390 and z Systems Usage License Charge Basic License

Specify the applicable S/390$^{(R)}$ and z Systems Usage License Charge option.

Charges will be based upon the Peak MSUs. Usage reported between thresholds of features 1, 2, or 3, will be rounded up to the next MSU level. Above 1.0 MSU, usage will be rounded to the nearest whole MSU. For example, 2.4 MSUs would round to 2.0 MSUs for pricing, and 2.5 MSUs would round to 3.0 MSUs for pricing.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

The customer pricing will be determined by selecting either:

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	0 to 0.25 MSU Base
S017GWJ	DB2 12 for z/OS	0.26 to 0.5 MSU Base
S017GWJ	DB2 12 for z/OS	0.51 to 1.0 MSU Base
S017GWJ	DB2 12 for z/OS	Level A Chg/MSU (2 to 11 MSUs)
S017GWJ	DB2 12 for z/OS	Level B Chg/MSU (12 to 44 MSUs)
S017GWJ	DB2 12 for z/OS	Level C Chg/MSU (45 to 78 MSUs)
S017GWJ	DB2 12 for z/OS	Level D Chg/MSU (Above 78 MSUs)
S017GWJ	DB2 12 for z/OS	Level D Chg/MSU (Above 78 MSUs), per 50 MSUs

Examples for ordering:

A customer with 6.6 MSUs (from the IBM Usage report) would:

- Be rounded up to 7.0 MSUs
- Order quantity 1 of the "0.51 to 1.0 MSU" base feature
- Order quantity 6 of the Level A 1 MSU feature

A customer with 15 MSUs (from the IBM Usage report) would:

- Order quantity 1 of the "0.51 to 1.0 MSU" base feature
- Order quantity 10 of the Level A 1 MSU feature
- Order quantity 4 of the Level B 1 MSU feature

A customer with 50 MSUs (from the IBM Usage report) would:

- Order quantity 1 of the "0.51 to 1.0 MSU" base feature
- Order quantity 10 of the Level A 1 MSU feature
- Order quantity 33 of the Level B 1 MSU feature
- Order quantity 6 of the Level C 1 MSU feature

A customer with 85 MSUs (from the IBM Usage report) would:

- Order quantity 1 of the "0.51 to 1.0 MSU" base feature
- Order quantity 10 of the Level A 1 MSU feature
- Order quantity 33 of the Level B 1 MSU feature
- Order quantity 34 of the Level C 1 MSU feature
- Order quantity 7 of the Level D 1 MSU feature

z Systems entry license charge (zELC)

To order zELC software, specify the program number and z800 model.

Specify the zELC monthly license option.

Program name: IBM DB2 12 for z/OS

Program PID: 5650-DB2

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, zELC
S01822D	QMF Enterprise Ed 12	Basic MLC, zELC
S01822F	QMF Classic Ed 12	Basic MLC, zELC
Entitlement identifier	Description	License option/ Pricing metric
S017GWM	Application Connect DB2	No charge

Program name: IBM DB2 11 for z/OS

Program PID: 5615-DB2

Entitlement identifier	Description	License option/ Pricing metric
S0181TL	QMF Classic Edition V12	Basic MLC, zELC
S0181TM	QMF Enterprise Edition V12	Basic MLC, zELC

Single version charging

To elect single version charging, the customer must notify and identify to IBM the prior program and replacement program and the designated machine the programs are operating on.

Basic machine-readable material

Orderable Supply ID	Language	Distribution medium	Description
S0180ZD	US English	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	DB2 12 for z/OS
S018259	Kanji	1/2 Inch Data Cartridge -IBM	DB2 12 for z/OS

Orderable Supply ID	Language	Distribution medium	Description
		3590 - 30 GB 128 Track	
S018228	US English	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Classic Ed 12
S018229	Multilingual	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Classic Ed 12
S01822B	US English	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Enterprise Ed 12
S01822C	Multilingual	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Enterprise Ed 12
S0180ZC	US English	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	z/OS Application Connect DB2

Orderable Supply ID	Language	Distribution medium	Description
S0181TN	US English	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Classic Edition V12
S0181TP	Multilingual	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Classic Edition V12
S0181TK	US English	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Enterprise Edition V12
S0181TJ	Multilingual	1/2 Inch Data Cartridge -IBM 3590 - 30 GB 128 Track	QMF Enterprise Edition V12

Unlicensed documentation

A memo, program directory, and one copy of the following publications are supplied automatically with the basic machine-readable material:

DB2 12 for z/OS (5650-DB2)

DB2 12 for z/OS feature:

Title	Order number
DB2 12 for z/OS Program Directory (ENU and JPN)	GI13-4624
DB2 12 for z/OS License Program Specification (ENU and JPN)	GC27-8853

QMF Enterprise Ed 12 feature:

Title	Order number
QMF Enterprise Edition V12 Program Directory (ENU)	GI13-4627
QMF distributed components DVD kit	LK5T-8907
QMF Enterprise Edition V12 Program Directory (MUL)	GI13-4628
QMF distributed components DVD kit	LK5T-8907

QMF Classic Ed 12 feature:

Title	Order number
QMF Classic Edition V12 Program Directory (ENU)	GI13-4625
QMF Classic Edition V12 Program Directory (MUL)	GI13-4626

z/OS Application Connectivity to DB2 for z/OS feature:

Title	Order number
z/OS Application Connectivity to DB2 for z/OS Program Directory	GI13-4629

DB2 11 for z/OS (5615-DB2)

QMF Enterprise Edition V12 feature:

Title	Order number
QMF 12 Enterprise Edition Program Directory (ENU)	GI13-4635
QMF distributed components DVD kit	LK5T-8907
QMF 12 Enterprise Edition Program Directory (MUL)	GI13-4636
QMF distributed components DVD kit	LK5T-8907

QMF Classic Edition V12 feature:

Title	Order number
QMF 12 Classic Edition Program Directory (ENU)	GI13-4633
QMF 12 Classic Edition Program Directory (MUL)	GI13-4634

To order a previous edition of a publication, use the correct suffix level for the version desired.

Subsequent updates (technical newsletters or revisions between releases) to the publications shipped with the product will be distributed to the user of record for as long as a license for this software remains in effect. A separate publication order or subscription is not needed.

Customized Offerings

Product deliverables are shipped only through CBPDO and ServerPac. These customized offerings are offered for internet delivery in countries where Shopz product ordering is available. Internet delivery reduces software delivery time and allows you to install software without the need to handle tapes. For more details on internet delivery, go to the Help section on the Shopz website.

You choose the delivery method when you order the software. IBM recommends internet delivery. In addition to internet and DVD, the supported tape delivery options include:

- 3590
- 3592

Most products can be ordered in ServerPac the month following their availability in CBPDO. z/OS can be ordered through CBPDO and ServerPac at general availability. Many products will also be orderable in a Product ServerPac without also having to order the z/OS operating system or subsystem.

Shopz and CFSW will determine the eligibility based on product requisite checking. For more details on the product ServerPac, go to the Help section on the Shopz website.

For additional information on the Product ServerPac option, see Software Announcement 212-272, dated July 31, 2012.

Production of software product orders will begin on the planned general availability date.

- CBPDO shipments will begin one week after general availability.
- ServerPac shipments will begin two weeks after general availability.

Terms and conditions

Agreement

IBM Customer Agreement

Variable charges apply

No

Indexed monthly license charge (IMLC) applies

No

Location license applies

No

Educational allowance available

Yes, 15% education allowance applies to qualified education institution customers.

Volume orders

Not applicable.

Replaced programs		Replacement programs	
Program number	Program name	Program number	Program name
5740-XYR	DB2 V1	5650-DB2	DB2 V12
5665-DB2	DB2 V2	5650-DB2	DB2 V12
5685-DB2	DB2 V3	5650-DB2	DB2 V12
5695-DB2	DB2 V4	5650-DB2	DB2 V12
5655-DB2	DB2 V5	5650-DB2	DB2 V12
5645-DB2	DB2 V6	5650-DB2	DB2 V12
5675-DB2	DB2 V7	5650-DB2	DB2 V12
5625-DB2	DB2 V8	5650-DB2	DB2 V12
5635-DB2	DB2 V9	5650-DB2	DB2 V12
5605-DB2	DB2 V10	5650-DB2	DB2 V12
5615-DB2	DB2 V11	5650-DB2	DB2 V12
5650-DB2	DB2 V12	To a follow-on program, if any.	

Warranty applies

Yes

Program services

- Support Center applies: Yes. Access available through the IBM Support Center.
- Available until discontinued: 12 months written notice.
- APAR Mailing Address:

  IBM Corporation
  555 Bailey Avenue
  San Jose, CA 95141-1003

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective.

Important: IBM does not warrant that any systems, products, or services are immune from, or will make your enterprise immune from, the malicious or illegal conduct of any party.

IBM Electronic Services

Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support, all at no additional cost to you.

Now integrated into the base operating system of AIX$^{(R)}$ V5.3, AIX V6.1, and AIX V7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type smitty esa_main, and select Configure Electronic Service Agent. In addition, ESA now includes a powerful web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent, go to the IBM Electronic Support website.

The IBM Electronic Support portal is a single internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

Benefits

Increased uptime: The Electronic Service Agent™ tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting and uploading system information to IBM Support. This can translate to less wasted

time monitoring the symptoms, diagnosing the error, and manually calling IBM Support to open a problem record. Its 24 x 7 monitoring and reporting mean intervention is not required to report errors.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM. The Electronic Service Agent tool is designed to securely transmit either through the internet (HTTPS or VPN) or modem to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system.

For additional information, go to the IBM Electronic Service Agent website.

More accurate reporting: Because system information and error logs are automatically uploaded to the IBM Support Center in conjunction with the service request, you are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support: Using the IBM ID entered during activation, you can view system and support information in the *My Systems and Premium Search* sections of the IBM Electronic Support page.

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent. Reports are available for any system associated with your IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium search and the Electronic Service Agent information that has been collected from your system, you are able to see search results that apply specifically to your systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or go to the IBM Electronic Support website.

Prices

For additional information and current prices, contact your local IBM representative.

Description: 5650-DB2, DB2 12 for z/OS features

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, zELC
S01822D	QMF Enterprise Ed 12	Basic MLC, zELC
S01822F	QMF Classic Ed 12	Basic MLC, zELC

Description: z/OS Application Connectivity feature is no charge as follows:

Entitlement identifier	Description	License option/ Pricing metric
S017GWM	z/OS Application Connect DB2	No Charge

Description: 5615-DB2, DB2 11 for z/OS features

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, zELC
S0181TL	QMF Classic Edition V12	Basic MLC, zELC

5650-DB2: DB2 12 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, PSLC below 3 MSU
S017GWJ	DB2 12 for z/OS	Basic MLC, PSLC AD
S017GWJ	DB2 12 for z/OS	SYSUSGREG NC, PSLC AD
S01822D	QMF Enterprise Ed 12	Basic MLC, PSLC below 3 MSU
S01822D	QMF Enterprise Ed 12	Basic MLC, PSLC AD
S01822D	QMF Enterprise Ed 12	SYSUSGREG NC, PSLC AD
S01822F	QMF Classic Ed 12	Basic MLC, PSLC below 3 MSU
S01822F	QMF Classic Ed 12	Basic MLC, PSLC AD
S01822F	QMF Classic Ed 12	SYSUSGREG NC, PSLC AD

5615-DB2: DB2 11 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, PSLC below 3 MSU
S0181TM	QMF Enterprise Edition V12	Basic MLC, PSLC AD
S0181TM	QMF Enterprise Edition V12	SYSUSGREG NC, PSLC AD
S0181TL	QMF Classic Edition V12	Basic MLC, PSLC below 3 MSU
S0181TL	QMF Classic Edition V12	Basic MLC, PSLC AD
S0181TL	QMF Classic Edition V12	SYSUSGREG NC, PSLC AD

5650-DB2: DB2 12 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, AWLC
S01822D	QMF Enterprise Ed 12	Basic MLC, AWLC
S01822F	QMF Classic Ed 12	Basic MLC, AWLC

5615-DB2: DB2 11 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, AWLC
S0181TL	QMF Classic Edition V12	Basic MLC, AWLC

5650-DB2: DB2 12 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, AEWLC
S01822D	QMF Enterprise Ed 12	Basic MLC, AEWLC
S01822F	QMF Classic Ed 12	Basic MLC, AEWLC

5615-DB2: DB2 11 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, AEWLC
S0181TL	QMF Classic Edition V12	Basic MLC, AEWLC

Variable Workload License Charges

5650-DB2: DB2 12 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, Variable WLC
S017GWJ	DB2 12 for z/OS	Workload Registration, Variable WLC
S01822D	QMF Enterprise Ed 12	Basic MLC, Variable WLC
S01822D	QMF Enterprise Ed 12	Workload Registration, Variable WLC
S01822F	QMF Classic Ed 12	Basic MLC, Variable WLC
S01822F	QMF Classic Ed 12	Workload Registration, Variable WLC

5615-DB2: DB2 11 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, Variable WLC
S0181TM	QMF Enterprise Edition V12	Workload Registration, Variable WLC
S0181TL	QMF Classic Edition V12	Basic MLC, Variable WLC
S0181TL	QMF Classic Edition V12	Workload Registration, Variable WLC

Sub-capacity charges for VWLC products

Sub-capacity charges for VWLC products are based on product LPAR utilization capacity. Product LPAR utilization capacity for a VWLC product is the highest number of MSUs utilized by the combined LPARs in which a VWLC product runs concurrently during a reporting period. The number of MSUs is based on the highest observed rolling 4-hour average utilization used by the combination of the relevant LPARs during the reporting period.

Sub-capacity charges terms and conditions

z Systems software charges at less than full machine capacity for eligible VWLC products apply when z/OS is running in z/Architecture[(R)] (64-bit) mode on an IBM z Systems 900, no other MVS[TM]-based operating system is licensed to that server, and the required information is provided by the customer in accordance with the applicable terms.

Sub-capacity charges for a VWLC product is based on the utilization of the LPARs where/when the product executes. To obtain charges at less than full machine capacity for VWLC products, the customer is required to:

- Sign and abide by the terms of the Attachment for IBM z Systems Workload License Charges - (Z125-6516).
- Obtain the latest version of the Sub-Capacity Reporting Tool.
- Install any VWLC product and IBM e(logo)server z Systems 900 Licensed Internal Code (LIC) service required for sub-capacity charging. Required service will be listed on the IBM z Systems Software Pricing website.
- Collect SMF data as required by the Sub-Capacity Reporting Tool. Retain the collected SMF data for a period of not less than six months.
- Use the IBM provided Sub-Capacity Reporting Tool to process the collected SMF data. The Sub-Capacity Report produced by the tool is used to determine required license capacity for the VWLC products. Required license capacity is determined based on the largest MSU value of a VWLC product running concurrently in all LPARs during the reporting period. IBM reserves the right to request the system data that supports these product-defined capacity values for a period of up to six months after the data was collected.
- Provide an initial Sub-Capacity Report to begin to receive the benefits of less than full machine capacity charges. Sub-capacity charging will follow submission

of a Sub-Capacity Report. There will be no retroactive application of sub-capacity charges.

- Submit Sub-Capacity Reports monthly.
- Submit Sub-Capacity Reports for all VWLC products with complete data for the entire reporting period to the email address and by the date specified in the current IBM z Systems Workload License Charges Exhibit (Z125-6324) and on the z Systems Software Pricing website.

  Sub-Capacity Reports that reflect a changed product defined capacity will be considered to be orders placed by the customer without further action on the customer's part, and IBM is authorized to make any resulting billing increase or decrease. To place an order for a new license or to discontinue licenses, move licenses between machines, report a hardware model upgrade, or enable or disable product features, the customer must contact IBM or their IBM Business Partner.

- Configure the machine to send weekly Transmit System Availability Data (TSAD) to IBM via the IBM z Systems 900 Remote Support Facility (RSF). If the machine cannot connect via the RSF, provide this TSAD via an alternate means documented in the z/OS publication *Planning for Workload License Charges* at the IBM z Systems Software Pricing website.

Country Multiplex Pricing Charges

5650-DB2: DB2 12 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, CMLC
S01822D	QMF Enterprise Ed 12	Basic MLC, CMLC
S01822F	QMF Classic Ed 12	Basic MLC, CMLC

5615-DB2: DB2 11 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, CMLC
S0181TL	QMF Classic Edition V12	Basic MLC, CMLC

CMLC is a new sub-capacity offering that enables clients to use their z System capacity within a given country without the constraints of sysplex aggregation rules and many of the limitations of previous reporting methodologies.

Entry Workload License Charge (EWLC):

5650-DB2: DB2 12 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S017GWJ	DB2 12 for z/OS	Basic MLC, Entry WLC
S01822D	QMF Enterprise Ed 12	Basic MLC, Entry WLC
S01822F	QMF Classic Ed 12	Basic MLC, Entry WLC

5615-DB2: DB2 11 for z/OS

Entitlement identifier	Description	License option/ Pricing metric
S0181TM	QMF Enterprise Edition V12	Basic MLC, Entry WLC
S0181TL	QMF Classic Edition V12	Basic MLC, Entry WLC

Entitlement identifier	Description	License option/ Pricing metric	Charge
S017GWJ	DB2 12 for z/OS	0 to 0.25 MSU Base	

Entitlement identifier	Description	License option/ Pricing metric	Charge
S017GWJ	DB2 12 for z/OS	0.26 to 0.5 MSU Base	
S017GWJ	DB2 12 for z/OS	0.51 to 1.0 MSU Base	
S017GWJ	DB2 12 for z/OS	Level A Chg/MSU (2 to 11 MSUs)	
S017GWJ	DB2 12 for z/OS	Level B Chg/MSU (12 to 44 MSUs)	
S017GWJ	DB2 12 for z/OS	Level C Chg/MSU (45 to 78 MSUs)	
S017GWJ	DB2 12 for z/OS	Level D Chg/MSU (Above 78 MSUs)	
S017GWJ	DB2 12 for z/OS	Level D Chg/MSU (Above 78 MSUs), per 50 MSUs	

PLC/ALC

Customers who pay a PLC and an ALC for a licensed program receive enhancements and future releases, if any, at no additional charge. Significant new functions may be offered as an optional feature and charged for separately. If a replacement program is announced and the customer elects to license the replacement program for a PLC/ALC and replace the prior program, an upgrade charge may apply.

The first payment consists of the primary license charge and the annual license charge. The annual license charge applies yearly thereafter.

IBM Global Financing

IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, from both IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or go to the IBM Global Financing website for more information.

IBM Global Financing offerings are provided through IBM Credit LLC in the United States, and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Rates are based on a customer's credit rating, financing terms, offering type, equipment type, and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice.

Order now

To order, contact your Americas Call Centers, local IBM representative, or your IBM Business Partner. To identify your local IBM representative or IBM Business Partner call 800-IBM-4YOU (426-4968). For more information, contact the Americas Call Centers.

Phone: 800-IBM-CALL (426-2255)

Fax: 800-2IBM-FAX (242-6329)

For IBM representative: callserv@ca.ibm.com

For IBM Business Partner: pwcs@us.ibm.com

Mail:

IBM Teleweb Customer Support
ibm.com(R) Sales Execution Center, Americas North

3500 Steeles Ave. East, Tower 3/4
Markham, Ontario
Canada L3R 2Z1

Reference:
LE001

The Americas Call Centers, our national direct marketing organization, can add your name to the mailing list for catalogs of IBM products.

Note: Shipments will begin after the planned availability date.

Trademarks

IBM z, IMS, z Systems, IBM z Systems, DB2 Connect, QMF, MVS, IBM z13, z13, Query Management Facility and Electronic Service Agent are trademarks of IBM Corporation in the United States, other countries, or both.
IBM, DB2, z/OS, CICS, WebSphere, FlashCopy, zEnterprise, PartnerWorld, AIX, S/390, Bluemix, Informix, Parallel Sysplex, DRDA, Express, Language Environment, RACF, pureQuery, APL2, InfoSphere, Guardium, Tivoli, OMEGAMON, pureXML, z/ Architecture and ibm.com are registered trademarks of IBM Corporation in the United States, other countries, or both.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.
Oracle and Java are trademarks of Oracle and/or its affiliates in the United States, other countries, or both.
Other company, product, and service names may be trademarks or service marks of others.

Terms of use

IBM products and services which are announced and available in your country can be ordered under the applicable standard agreements, terms, conditions, and prices in effect at the time. IBM reserves the right to modify or withdraw this announcement at any time without notice. This announcement is provided for your information only.Additional terms of use are located at

Terms of use

For the most current information regarding IBM products, consult your IBM representative or reseller, or visit the IBM worldwide contacts page

IBM United States